Monitoring Data Record

Project Title: R-2210A Site 1 (Waynesville Site 1) COE Action ID: 200130653
Stream Name: Raccoon Creek DWQ Number: 010409
City, County and other Location Information: Sta. 30 on Bus. 23 S in Waynesville, Haywood Co.
Date Construction Completed: July 2003 (lower portion), 2005 (upper portion)
Monitoring Year: (5) of 5
Ecoregion: 8 digit HUC unit 06010106
USGS Quad Name and Coordinates:
Rosgen Classification:
Length of Project: 1225' Urban or Rural: Rural Watershed Size:
Monitoring DATA collected by: M. Green and J. Young Date: 3/4/09
Applicant Information:
Name: NCDOT Roadside Environmental Unit
Address: 1425 Rock Quarry Rd. Raleigh, NC 27610
Telephone Number: (919) 861-3772 Email address: mlgreen@ncdot.gov
Consultant Information:
Name:
Address:
Telephone Number: Email address:
Project Status: Complete

Monitoring Level required by COE and DWQ (404 permit/ 401 Cert.): Level (**1**) ~~2~~ ~~3~~
Monitoring Level 1 requires completion of *Section 1, Section 2 and Section 3*
Permit States: NCDOT shall perform the following components of Level I monitoring twice each year for the 5 year monitoring period (summer and winter): Reference photos, plant survival, and visual inspection of channel stability. If less than two bankfull events occur during the first 5 years, NCDOT shall continue monitoring until the second bankfull event is documented. The bankfull events must occur during separate monitoring years. In the event that the required bankfull events do not occur during the 5 year monitoring period, the USACE, in consultation with resource agencies, may determine that further monitoring is not required.

Section 1. PHOTO REFERENCE SITES
(Monitoring at all levels must complete this section)

Attach site map showing the location and angle of all reference photos with a site designation (name, number, letter, etc.) assigned to each reference photo location. Photos should be provided for all structures and cross section locations, should show both banks and include an upstream and downstream view. Photos taken to document physical stability should be taken in winter. Photos taken to document vegetation should be taken in summer (at representative locations). Attach photos and a description of each reference photo or location. We recommend the use of a photo identification board in each photo to identify location.

Total number of reference photo locations at this site: 6 reference points, 2 photos at each
Dates reference photos have been taken at this site: 5/20/04, 11/1/04, 5/31/05, 3/21/06, 10/18/06, 2/28/07, 9/12/07, 2/12/08, 8/13/08, 3/4/09

Individual from whom additional photos can be obtained (name, address, phone):

Other Information relative to site photo reference: A site map with photo point locations is included with this report.

If required to complete Level 3 monitoring only stop here; otherwise, complete section 2.

Section 2. PLANT SURVIVAL
Attach plan sheet indicating reference photos.

Identify specific problem areas (missing, stressed, damaged or dead plantings):

Estimated causes, and proposed/required remedial action:

ADDITIONAL COMMENTS: Vegetation is dormant at this time. Stream is highly vegetated with alder, tulip poplar, white oak, river birch, white pine, elderberry, silky dogwood, sycamore, black willow, red maple, willow oak, buttonbush, arrowwood, and thick herbaceous vegetation. Some of the herbaceous vegetation noted was goldenrod, jewelweed, sedge, *Juncus* sp., tearthumb, and various herbaceous vegetation. NCDOT proposes to discontinue vegetation monitoring at R-2210A Raccoon Creek stream relocation.

If required to complete Level 1 and Level 2 monitoring only stop here; otherwise, complete section 3.

Section 3. CHANNEL STABILITY

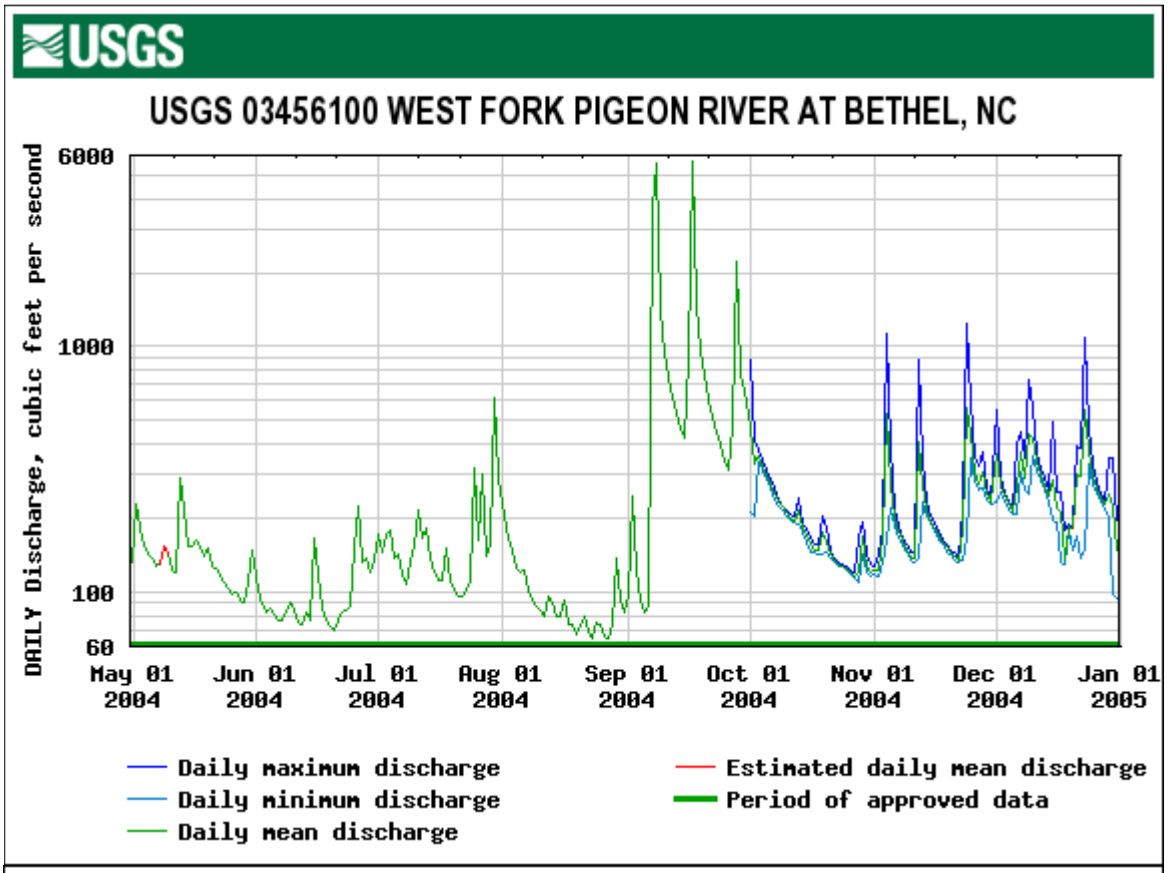
Visual Inspection: The entire stream project as well as each in-stream structure and bank stabilization/revetment structure must be evaluated and problems addressed.

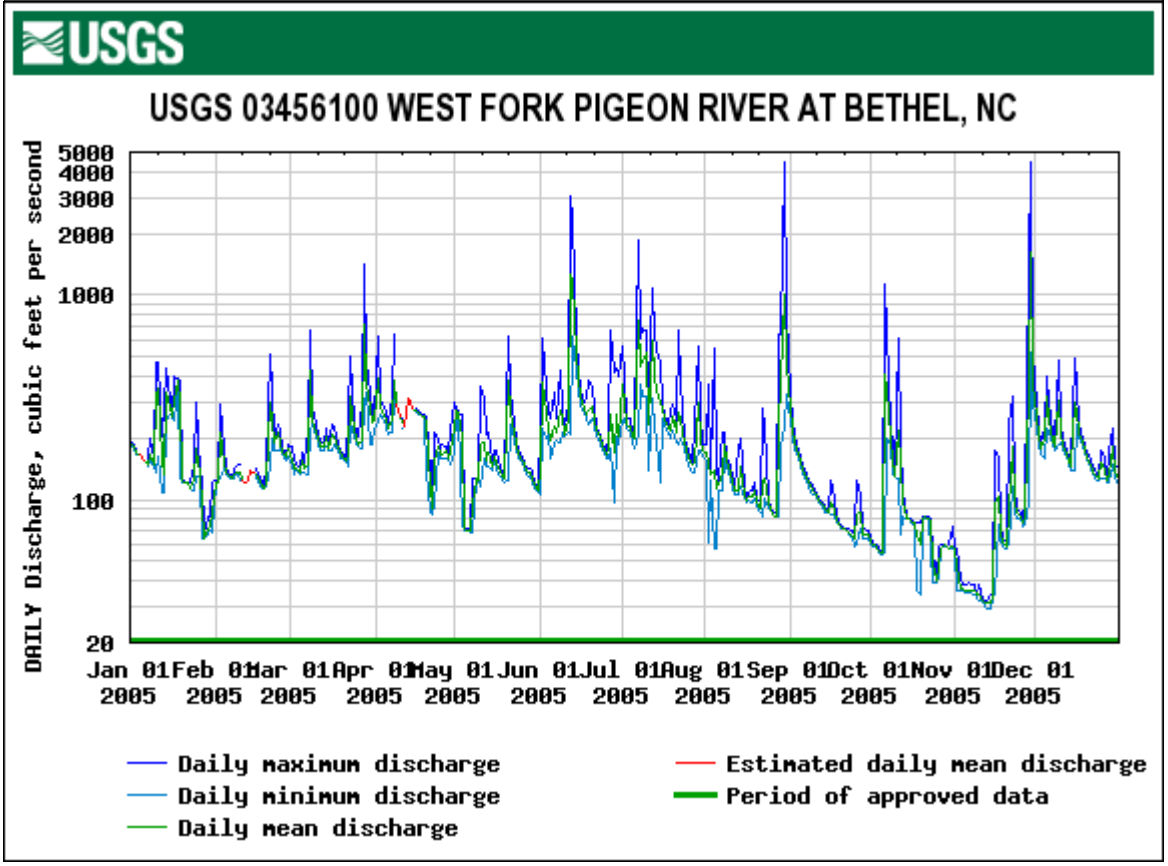
Report on the visual inspection of channel stability. Physical measurements of channel stability/morphology will not be required. Include a discussion of any deviations from as-built and an evaluation of the significance of these deviations and whether they are indicative of a stabilizing or destabilizing situation.

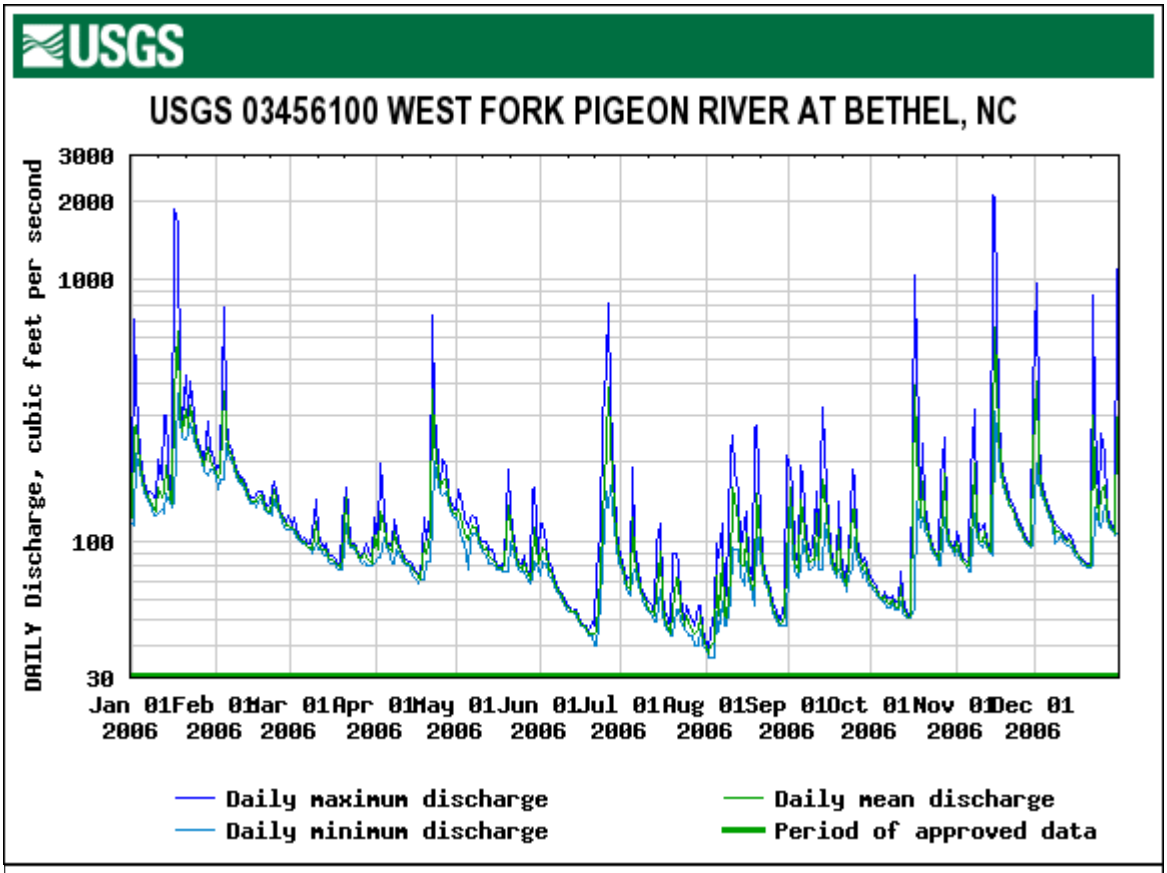
R-2210A (Site 1) Raccoon Creek is stabilized for the Year 5 Winter Evaluation except for some minor bank scouring in a few bends on the outside bank and some minor bank erosion behind a rootwad. No remedial action is warranted. A bankfull event has occurred since the last monitoring evaluation. NCDOT visually documented 4 bankfull events that were noted during the 2004, 2006, 2007, and 2009 evaluations. A review of known USGS surface water gages identified one gage approximately 5 miles from the R-2210A (Site 1) Raccoon Creek stream relocation which is the West Fork Pigeon River gauge near Bethel, NC. The West Fork Pigeon River gauge has a drainage area of 58.4 square miles. It is situated in USGS Hydrologic Unit 06010106. Based on the drainage area associated with the gage, the correlated bankfull discharge according to the NC Mountain and Piedmont Regional Curve is approximately 2800 cubic feet per second (cfs). A review of peak flows conducted for the period between May 2004 to March 2009 shows that there was approximately 8 bankfull events during our monitoring period. The USGS graph depicting the peak flows occurring during our monitoring period is below. NCDOT proposes to discontinue channel stability monitoring at R-2210A Raccoon Creek stream relocation.

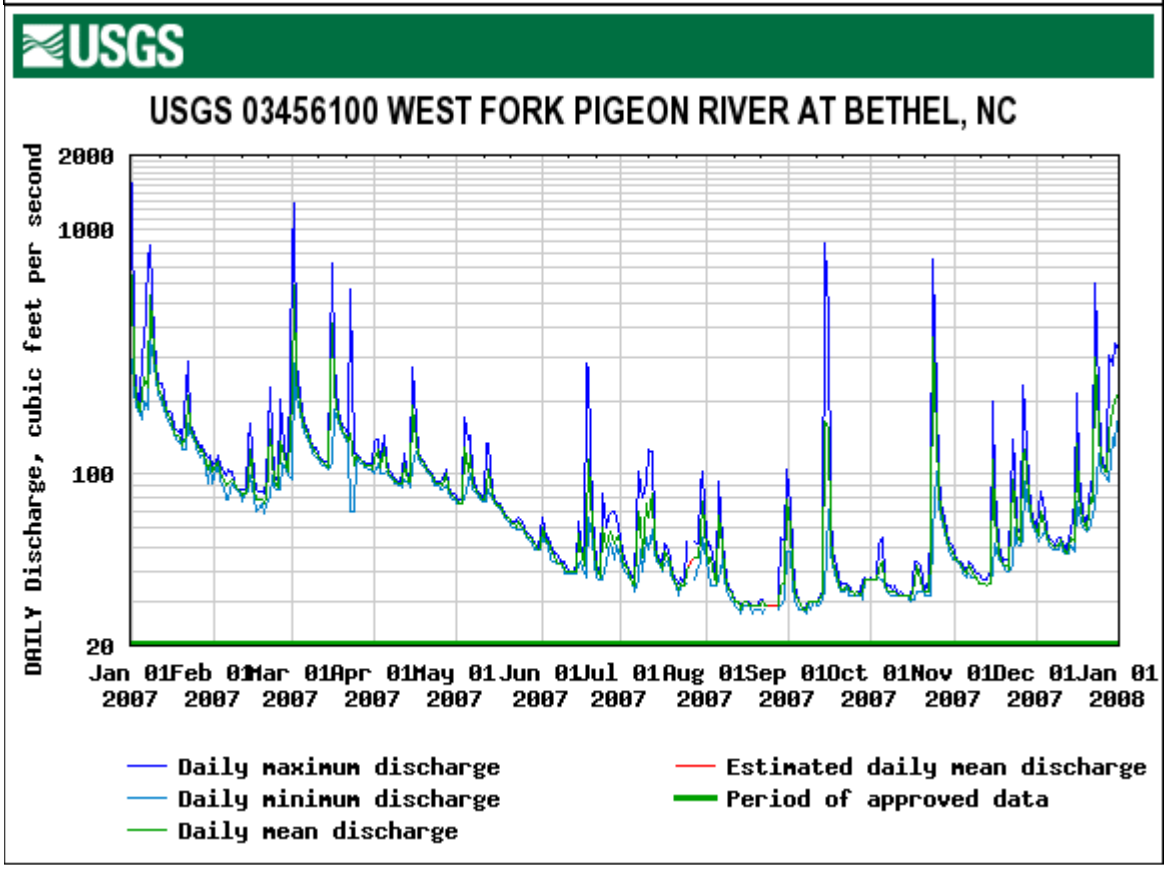
3/4/09	Sta. 30+20 Photo 2 Downstream	Sta. 30+60 Photo 4 Downstream	Sta. 31+10 Photo 5 Upstream	Station Number	Station Number
Structure Type					
Is water piping through or around structure?					
Head cut or down cut present?					
Bank or scour erosion present?	Bank scouring on right bank	Bank scouring on left bank.	Bank scouring behind rootwad on right bank		
Other problems noted?					

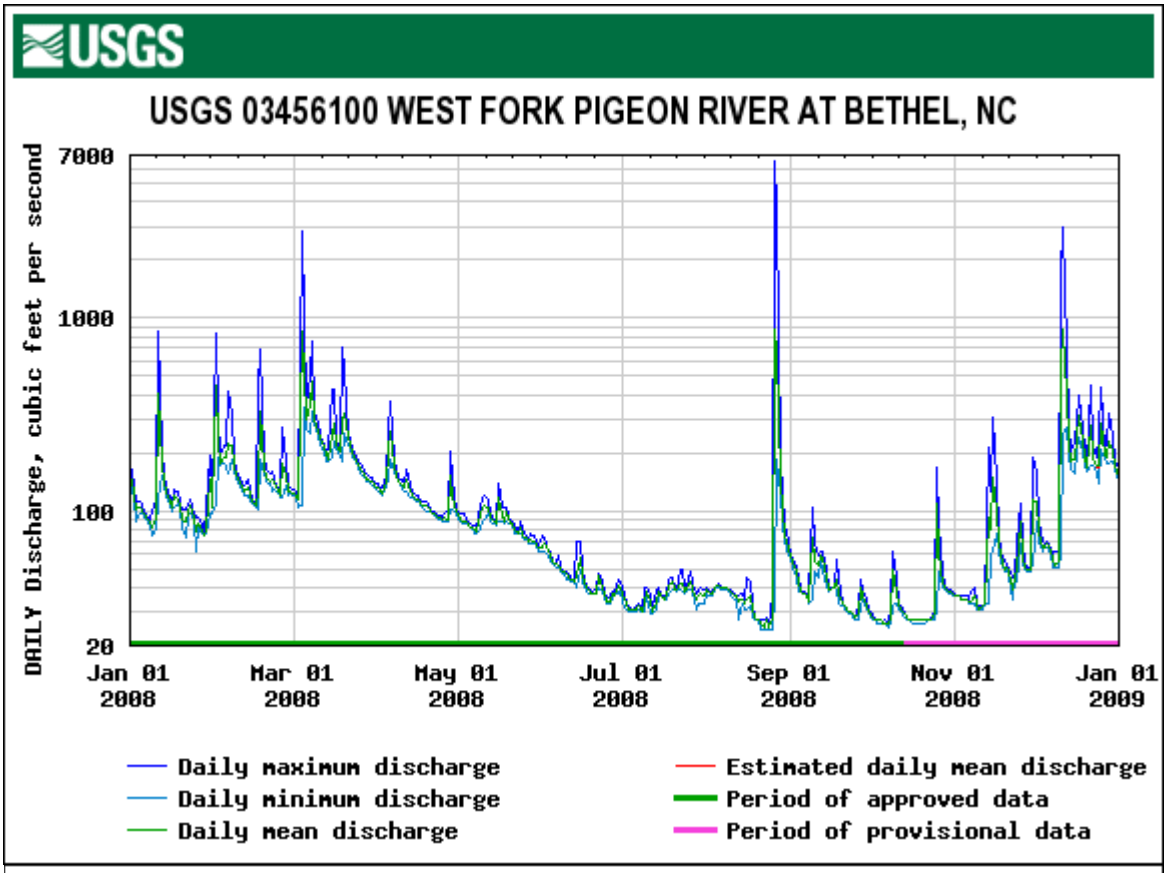
NOTE: Attach separate narrative sheets to each monitoring report describing/discussing the overall monitoring results. Include the identification of specific problem areas/channel failures, estimated cause and proposed/required remedial action. This should include a brief discussion of any parameter that has changed significantly from as-built.

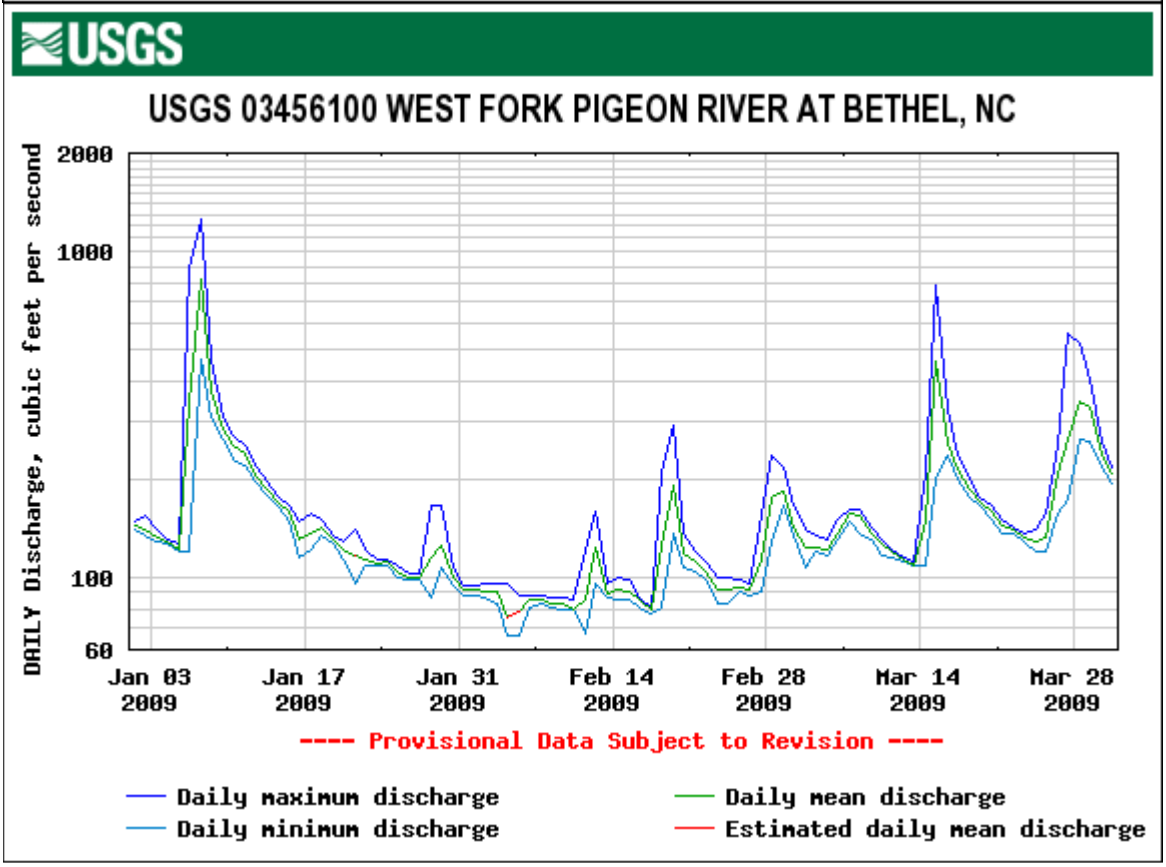

USGS
USGS 03456100 WEST FORK PIGEON RIVER AT BETHEL, NC
DAILY Discharge, cubic feet per second
6000
1000
100
60
May 01 2004
Jun 01 2004
Jul 01 2004
Aug 01 2004
Sep 01 2004
Oct 01 2004
Nov 01 2004
Dec 01 2004
Jan 01 2005
Daily maximum discharge
Daily minimum discharge
Daily mean discharge
Estimated daily mean discharge
Period of approved data


USGS
USGS 03456100 WEST FORK PIGEON RIVER AT BETHEL, NC
DAILY Discharge, cubic feet per second
5000
4000
3000
2000
1000
100
20
Jan 01 2005
Feb 01 2005
Mar 01 2005
Apr 01 2005
May 01 2005
Jun 01 2005
Jul 01 2005
Aug 01 2005
Sep 01 2005
Oct 01 2005
Nov 01 2005
Dec 01 2005
Daily maximum discharge
Daily minimum discharge
Daily mean discharge
Estimated daily mean discharge
Period of approved data


USGS
USGS 03456100 WEST FORK PIGEON RIVER AT BETHEL, NC
DAILY Discharge, cubic feet per second
3000
2000
1000
100
30
Jan 01 2006
Feb 01 2006
Mar 01 2006
Apr 01 2006
May 01 2006
Jun 01 2006
Jul 01 2006
Aug 01 2006
Sep 01 2006
Oct 01 2006
Nov 01 2006
Dec 01 2006
Daily maximum discharge
Daily minimum discharge
Daily mean discharge
Period of approved data


USGS
USGS 03456100 WEST FORK PIGEON RIVER AT BETHEL, NC
DAILY Discharge, cubic feet per second
2000
1000
100
20
Jan 01 2007
Feb 01 2007
Mar 01 2007
Apr 01 2007
May 01 2007
Jun 01 2007
Jul 01 2007
Aug 01 2007
Sep 01 2007
Oct 01 2007
Nov 01 2007
Dec 01 2007
Jan 01 2008
Daily maximum discharge
Daily minimum discharge
Daily mean discharge
Estimated daily mean discharge
Period of approved data


USGS
USGS 03456100 WEST FORK PIGEON RIVER AT BETHEL, NC
DAILY Discharge, cubic feet per second
7000
1000
100
20
Jan 01 2008
Mar 01 2008
May 01 2008
Jul 01 2008
Sep 01 2008
Nov 01 2008
Jan 01 2009
Daily maximum discharge
Daily minimum discharge
Daily mean discharge
Estimated daily mean discharge
Period of approved data
Period of provisional data


USGS
USGS 03456100 WEST FORK PIGEON RIVER AT BETHEL, NC
DAILY Discharge, cubic feet per second
2000
1000
100
60
Jan 03 2009
Jan 17 2009
Jan 31 2009
Feb 14 2009
Feb 28 2009
Mar 14 2009
Mar 28 2009
---- Provisional Data Subject to Revision ----
Daily maximum discharge
Daily minimum discharge
Daily mean discharge
Estimated daily mean discharge

Waynesville Site 1

Photo 1(Upstream)

Photo 2 (Downstream)

Photo 3 (Upstream)

Photo 4 (Downstream)

Photo 5 (Upstream)

Photo 6 (Downstream)

Year 5 Winter – March 2009

Waynesville Site 1

Photo 7 (Upstream)

Photo 8 (Downstream)

Photo 9 (Upstream)

Photo 10 (Downstream)

Photo 11 (Upstream)

Photo 12 (Downstream)

Year 5 Winter – March 2009

Waynesville Site 1

Overview looking upstream

Overview looking downstream

Additional photo of crossvane at outlet of double barrel box culvert

R-2210A
UT to Raccoon Creek (Site 1)
Photo Point Locations